3 Comparison of the Alternatives – Safety and Mobility

Chapter 3 examines the current and future transportation significance of SR 502. It compares the No Build Alternative and the Build Alternative in terms of improving safety and mobility on the roadway in the future. This chapter also looks at the transportation-related effects on nearby roads, parking, bicycle and pedestrian traffic, and transit.

What is the transportation significance of SR 502?

SR 502 is one of the primary routes providing access to the City of Battle Ground and surrounding areas. The state highway follows NE 219th Street west from Battle Ground to the I-5/SR 502 interchange, where it connects to the regional highway system. The other primary regional travel route from the Battle Ground area is SR 503, which connects Battle Ground to Vancouver at I-205 (Exhibit 3-1). Approximately 60 percent of the traffic using the SR 502 corridor travels to and from Battle Ground; approximately 25 percent travels to areas north of Battle Ground; and the remaining 15 percent travels to outlying areas east and south of Battle Ground.

The project corridor – that is, the section of SR 502 for which improvements are proposed – extends along NE 219th Street between NE 15th Avenue and NE 102nd Avenue (mile post 2.3 to mile post 6.5). This chapter details traffic conditions both on the project corridor as well as for a broader transportation study area so that traffic effects on other, nearby routes are also considered (Exhibit 3-1).

KEY POINT

WHAT IS THE DIFFERENCE BETWEEN THE PROJECT CORRIDOR AND THE TRANSPORTATION STUDY AREA?

The "Project Corridor" refers to the segment of SR 502 for which improvements are proposed. It stretches along NE 219th Street between NE 15th Avenue and NE 102nd Street. The "Transportation Study Area" is a broader area where traffic conditions are evaluated to identify any effects to other transportation facilities. The Transportation Study Area is roughly bounded by NE 239th Street to the north, SR 503 to the east, NE 179th Street to the south, and NE 10th Avenue to the west.

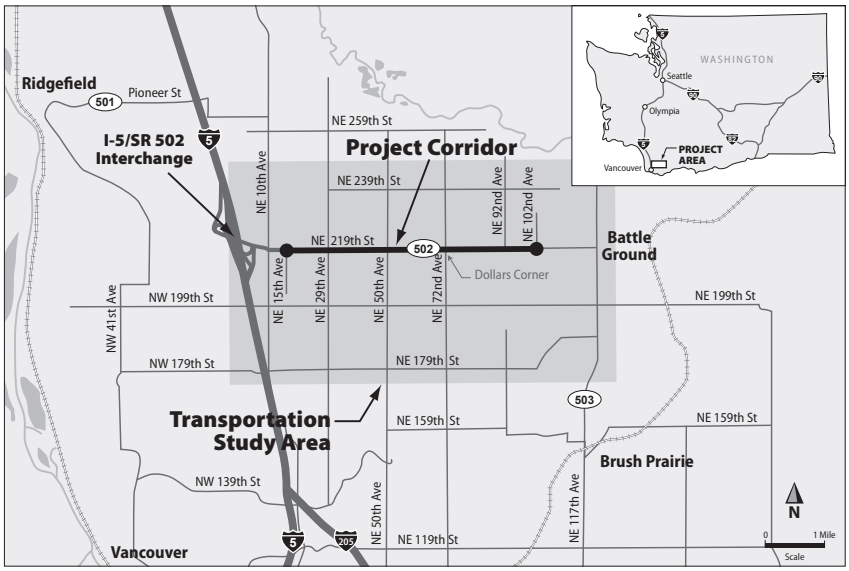


Exhibit 3-1: Project corridor and transportation study area

Currently, the project corridor is a two-lane highway with narrow shoulders. Left turn pockets are only provided at the NE 72nd Avenue intersection in both the westbound and eastbound directions. This intersection is signalized, while all other intersections on SR 502 (NE 219th Street) between NE 15th Avenue and NE 92nd Avenue have stop signs that control traffic on the side streets only. Abutting properties typically have driveway access directly to SR 502, and some properties have more than one driveway connection to SR 502.

East of the project corridor (east of NE 102nd Avenue in Battle Ground), the roadway cross section is generally five lanes, with two travel lanes in each direction plus a center turn lane. West of NE 15th Avenue, improvements associated with the I-5/SR 502 interchange include two travel lanes in each direction and median barrier.

How is traffic on the SR 502 corridor expected to grow over time?

Today, depending on the location, typical weekday traffic volumes on the SR 502 corridor range from 13,605–15,835 vehicles per day, with higher volumes occurring near Dollars Corner (NE 72nd Avenue) and to the east toward Battle Ground. Commuters traveling toward I-5 to access jobs in the Portland–Vancouver metro area create higher westbound volumes during the morning, and higher eastbound volumes during the evening as workers return home. A smaller reverse commute is evident as well, with residents elsewhere traveling to jobs in Battle Ground. In addition, SR 502 is a primary route for freight and goods movement between Battle Ground and I-5.

Today, traffic volumes are highest during the evening commute. Peak volumes on the SR 502 corridor today occur at NE 92nd Avenue, where approximately 825 vehicles per hour travel east toward Battle Ground and 575 travel west during the evening peak hour. Volumes during the morning commuter peak hour are generally 10 percent lower and the predominate flow occurs in the opposite direction (westbound).

Traffic volumes along SR 502 are expected to increase markedly by 2015. Continuing population and job growth in Battle Ground and elsewhere in Clark County will increase traffic along the SR 502 corridor. By 2015, daily traffic volumes for the No Build Alternative are expected to range between 20,745 and 21,910, roughly a 40 percent to 50 percent increase over today. Commuting patterns will continue to result in higher westbound volumes during the morning and higher eastbound volumes during the evening. Peak evening commute volumes at the SR 502/NE 92nd Avenue intersection are expected to reach 1,105 vehicles per hour traveling eastbound toward Battle Ground and 775 vehicles per hour traveling westbound.

The Build Alternative would increase capacity and improve traffic conditions on SR 502, thus attracting some additional traffic. By 2015, between 21,990 and 23,700 vehicles per day are expected to use the project corridor under the Build Alternative. During the evening, peak traffic volumes would reach 1,175 eastbound toward Battle Ground and 810 westbound vehicles per hour; an increase of approximately five percent over the No Build Alternative.

By 2033, SR 502 will carry nearly three times more traffic than it does today. Daily traffic volumes are expected to range from 37,720–39,815 for the No Build Alternative and 39,975–43,020 for the Build Alternative (Exhibit 3-2) with peak volumes occurring east of NE 72nd Avenue. For the No Build Alternative, evening peak traffic volumes will reach 2,130 eastbound and 1,400 westbound (Exhibit 3-3). For the Build Alternative, the evening peak traffic volumes will reach 2,015 eastbound toward Battle Ground and 1,375 westbound vehicles per hour.

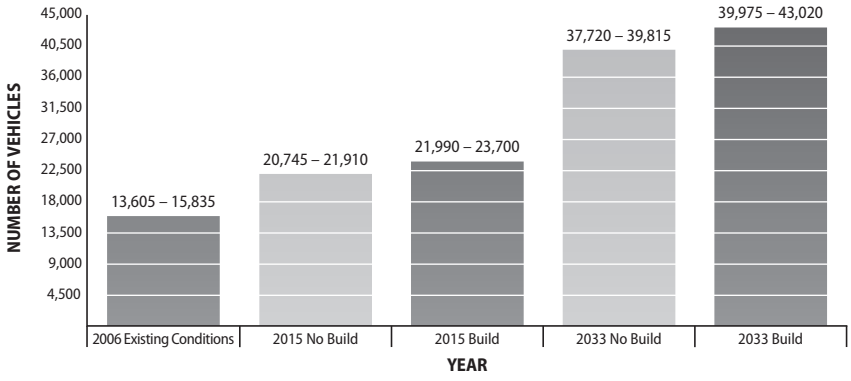


Exhibit 3-2: Typical weekday traffic volumes on SR 502

KEY POINT

WHY WERE 2015 AND 2033 SELECTED AS ANALYSIS YEARS?

If the Build Alternative is built, construction would begin in the year 2012 and is expected to be completed and open to traffic by 2015. The near-term traffic analysis therefore reflects conditions that would be expected shortly after the project opens.

Federal and state environmental guidelines, as well as the *Washington State Department of Transportation Design Manual*, call for a longer-term analysis of conditions at least 20 years past the expected start of construction. Construction was initially expected to begin in 2013, so 2033 was selected as the long-term analysis year, which is still at least 20 years past the current start of construction in 2012.

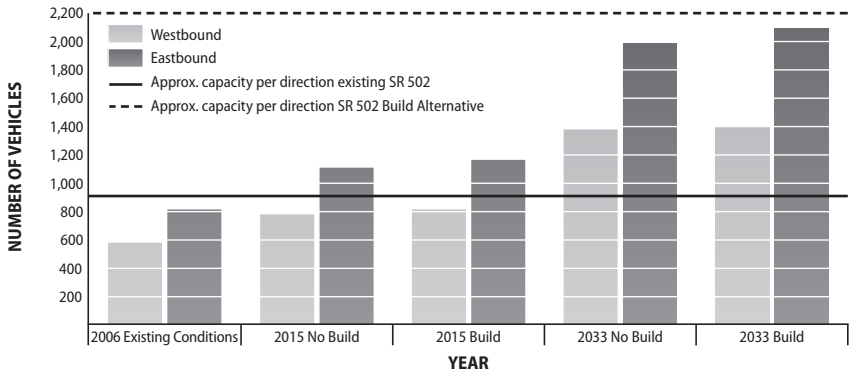


Exhibit 3-3: Typical evening peak hour volumes – eastbound and westbound at the intersection of SR 502 and 92nd Ave

Under the No Build Alternative, by 2033 traffic volumes along the corridor would increase to a level such that the current one hour morning and evening peak periods would blend together. Volumes in both directions would exceed capacity for over 10 hours every weekday. Today's commute time between I-5 and Battle Ground would more than double by 2033 under the No Build Alternative.

Though the Build Alternative would provide new traffic signals at NE 29th Avenue, NE 50th Avenue, and NE 92nd Avenue, by 2033 traffic volumes on these side roads are expected to be similar to the No Build Alternative. Traffic volumes on NE 72nd Avenue in the Dollars Corner area are expected to double by 2033, with peak hourly volumes approaching 820 vehicles per hour southbound in the morning, and 980 vehicles per hour northbound in the evening. However, the level of service on NE 72nd Avenue is expected to be similar under the No Build Alternative or Build Alternative.

In summary, travel demand along the SR 502 project corridor is projected to grow substantially over time, nearly tripling today's traffic volumes by 2033, whether the project is built or not. The improvements proposed with the Build Alternative would attract some additional traffic, mostly from local routes parallel to SR 502. However, the trips between parallel local routes are not anticipated to increase traffic substantially on side-streets. Instead, traffic accessing the corridor would do so before entering the transportation study area. Thus, forecasted traffic on side-streets for the Build Alternative is similar to the No Build Alternative.

DEFINITION

LEVEL OF SERVICE (LOS)

Level of service is a standard measure describing traffic conditions. Level of service is based on average delay experienced by motorists, and is reported using letter designations from A to F, with LOS A representing the best operating conditions (no congestion) and LOS F the worst (near or at-gridlock conditions). Traffic conditions correspond to Level of Service designations as follows:

- LOS A to LOS C – Low to moderate congestion
- LOS D – Congested
- LOS E and LOS F – Severely congested

How do the alternatives compare in their ability to move people and goods?

The SR 502 project corridor experiences congestion today during the peak commute periods. With more motorists projected to use the corridor in the future, congestion is expected to worsen considerably if improvements are not made. In contrast, under the Build Alternative

travel delays in the project corridor would be reduced and the future traffic volumes could be accommodated.

A number of factors contribute to congestion on SR 502 today. The roadway has limited capacity to move traffic since only one lane is provided in each direction. A single lane limits opportunities to pass slow moving traffic, which on occasion includes bicycles. Right-turning vehicles have to slow down prior to exiting the roadway, slowing those following behind. Traffic attempting to turn left also blocks the through travel lane in most locations since turn pockets are not provided except at NE 72nd Avenue. Delays related to left-turns can be especially significant during peak periods, when turning vehicles typically have to wait longer to find suitable gaps in oncoming traffic.

Traffic on cross streets is also affected by congested conditions on SR 502. NE 72nd Avenue is the only location in the project corridor where a traffic signal provides opportunities for cross-traffic to easily enter or cross the highway during periods of heavy traffic. Severe congestion is experienced today during the morning and/or evening commute at the NE 29th Avenue, NE 37th Avenue, NE 50th Avenue, NE 67th Avenue, and NE 72nd Avenue intersections (Exhibit 3-4). Congestion at these intersections is related to delay on the cross-street connections, except at NE 72nd Avenue where the level of service includes delays on both SR 502 and NE 72nd Avenue.

With the No Build Alternative, congestion is expected to worsen substantially in the future. By 2033, higher traffic volumes will result in severe congestion at all of the SR 502 transportation study area intersections. The most pronounced degradation of travel conditions

NE 29th Ave	AM Peak	PM Peak
2006 Existing	▼	▼
2015 No Build	▼	▼
2015 Build	▲	▲
2033 No Build	▼	▼
2033 Build	▲	●

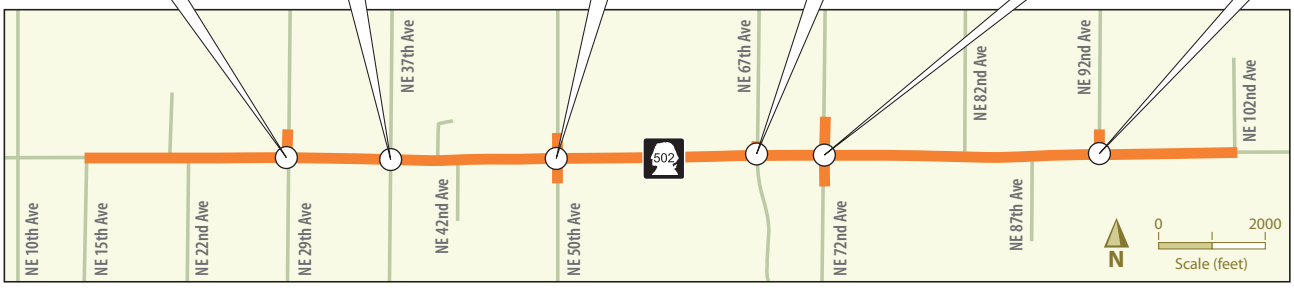
NE 37th Ave	AM Peak	PM Peak
2006 Existing	●	▼
2015 No Build	▼	▼
2015 Build	▲	▲
2033 No Build	▼	▼
2033 Build	●	▼

NE 50th Ave	AM Peak	PM Peak
2006 Existing	▼	▼
2015 No Build	▼	▼
2015 Build	▲	▲
2033 No Build	▼	▼
2033 Build	▲	▲

NE 67th Ave	AM Peak	PM Peak
2006 Existing	●	▼
2015 No Build	▼	▼
2015 Build	▲	▲
2033 No Build	▼	▼
2033 Build	▲	●

NE 72nd Ave	AM Peak	PM Peak
2006 Existing	▲	▼
2015 No Build	▼	▼
2015 Build	▲	▲
2033 No Build*	▼	▼
2033 Build*	▼	●

NE 92nd Ave	AM Peak	PM Peak
2006 Existing	●	●
2015 No Build	▼	▼
2015 Build	▲	▲
2033 No Build	▼	▼
2033 Build	▲	▲



Extent of Build Alternative ▲ Level of service A–C: Low to moderate congestion ● Level of service D: Congested ▼ Level of service E-F: Severely congested

* In 2033, the Build Alternative would perform at level of service E during morning peak hours at the intersection of SR 502 and NE 72nd Ave. This represents significantly less delay than the No Build Alternative, which would perform at level of service F in that year.

Exhibit 3-4: Projected level of service along the project corridor

will occur during the morning and evening peak hours, though congestion will be present for longer portions of the day as well.

Based on the analysis, the Build Alternative would reduce congestion in the project corridor, considerably benefiting auto, transit, emergency services and goods movement. When the project is completed in 2015, all corridor intersections are forecast to operate with little to moderate congestion throughout the day. Given the traffic growth forecast for 2033, even with the Build Alternative some intersections would experience moderate or severe congestion during the peak hours, though conditions would be much better than the No Build Alternative. See Appendix Q, *Transportation Discipline Report*, for further details.

At the Dollars Corner area, the Build Alternative would also improve the movement of people and goods because the roadway pavement at this intersection (NE 72nd Avenue) would be slightly wider to ensure easy maneuvering for large vehicles, including emergency vehicles. Pedestrian and bicycle improvements including sidewalks and bicycle lanes, would also facilitate movement of people at Dollars Corner.

The ability of the Build Alternative to improve the mobility of people and goods is further shown by comparing expected travel speeds. The posted speed limit in the project corridor is 50 miles per hour, except at Dollars Corner where it is 35 miles per hour. During the morning and evening peak hours, travel speeds under the Build Alternative would generally maintain current speeds through the year 2015, and still maintain average speeds around 28 mph by 2033. In contrast, travel speeds under the No Build Alternative are expected to fall to nine to 13 miles per hour by 2033 (Exhibit 3-5).

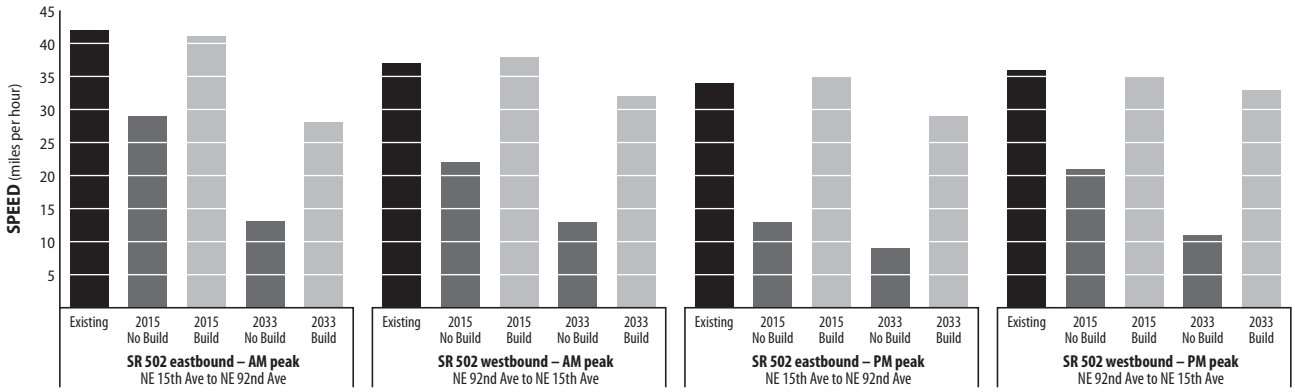


Exhibit 3-5: Average peak hour corridor speeds

How do the alternatives compare in their ability to provide safe travel?

A primary objective of the SR 502 Corridor Widening Project is to improve safety in the project corridor. SR 502 between NE 37th Avenue

and just east of NE 50th Avenue is designated as a High Accident Corridor by Washington State Department of Transportation for 2007 through 2009. The segments of SR 502 between NE 10th Avenue and NE 29th Avenue and between NE 50th Avenue and NE 82nd Avenue have also been designated as High Accident Corridors in the past. Collision rates in the project corridor have increased sharply in recent years; if safety improvements are not made, continuing growth in traffic is expected to further increase collision rates that are already above the statewide average (Exhibit 3-6).

DEFINITION

WHAT IS A HIGH ACCIDENT CORRIDOR?

High Accident Corridors are sections of state highway one or more miles long, with a higher than average number of severe accidents over a continuous period of time. The state average accident rate for corridors similar to SR 502 ranges from 1.11 for Rural Principal Arterials to 2.56 for Urban Principal Arterials. SR 502 exhibits characteristics of both types of facilities.

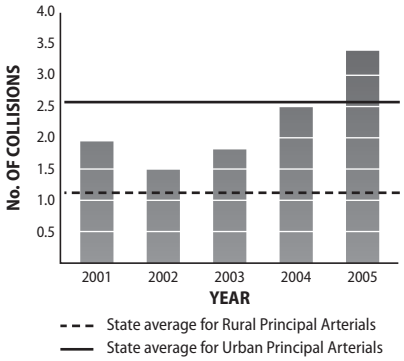


Exhibit 3-6: Number of collisions per million vehicle miles traveled on SR 502, 2001–2005

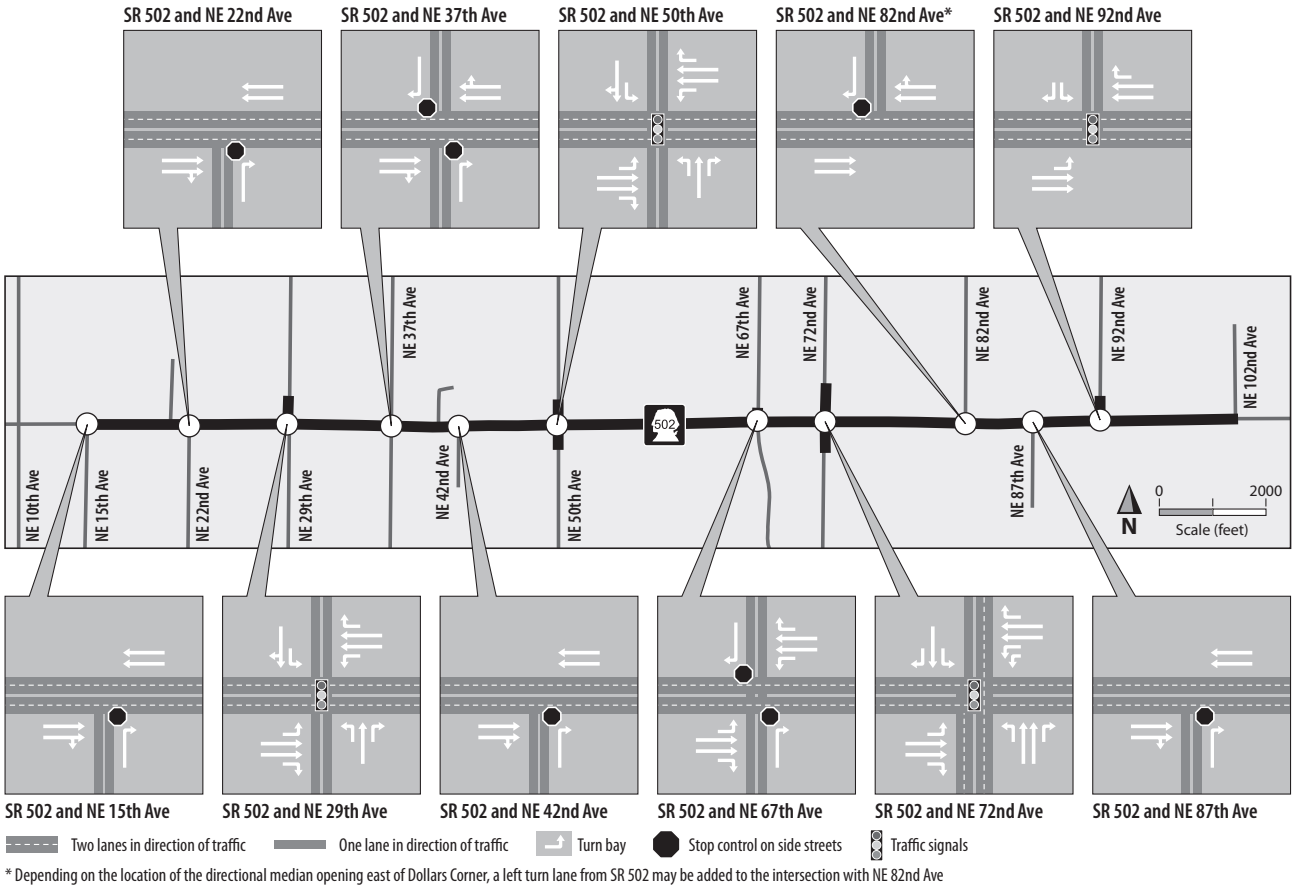
With the No Build Alternative, the existing conditions that are a concern for safe travel in the project corridor would continue and potentially worsen with increases in traffic volumes. Most adjacent properties have driveway connections to the highway where vehicles may enter or exit to travel on SR 502 in either direction. Within the project corridor, there are approximately 150 driveway connections to SR 502. Left turns to and from driveways across oncoming traffic on SR 502 are a safety concern as they are unpredictable and pose a risk for rear-end collisions.

With the exception of NE 72nd Avenue, access at streets intersecting SR 502 occurs without the benefit of traffic signal control. Therefore, similar potential safety risks from left-turns exist at intersections and at driveways. In addition, cars that may attempt to dart across both lanes of travel to continue straight across SR 502 at an unsignalized intersection also pose a safety concern.

Opposing directions of travel are not separated on SR 502, which increases the potential for head-on collisions. When they occur, these collisions tend to be more severe on higher-speed highways such as SR 502. They may also occur more frequently in the future as traffic volumes increase. In addition, the corridor currently has narrow shoulders and only a few short sidewalk segments near Dollars Corner, which provide little refuge for pedestrians or bicyclists from traffic on SR 502.

The Build Alternative includes many changes to address safety, particularly changes that greatly reduce the potential for collisions associated with left-turning vehicles (Exhibit 3-7). A median treatment, such as a curb or barrier, would be installed within the median under the Build Alternative, which would substantially reduce the potential for head-on collisions as well as eliminate dangerous left-turn movements into and out of driveways. These movements would be restricted to right-turns, which pose a lower risk for collisions. Further, the intersections of NE 29th Avenue, NE 50th Avenue, NE 72nd Avenue, and NE 92nd Avenue would be signalized, which would control access onto and across the project corridor at these locations. Except at two directional median openings where left-turns would be allowed from SR 502, other inter-

A typical median treatment



* Depending on the location of the directional median opening east of Dollars Corner, a left turn lane from SR 502 may be added to the intersection with NE 82nd Ave

Exhibit 3-7: 2033 Build Alternative recommended lane configurations

sections would be restricted to right-turns only, with u-turns allowed at signalized intersections to allow drivers to reverse direction.

DEFINITION

WHAT IS A SIGNAL WARRANT?

A signal warrant is a threshold condition that results in analysis of traffic conditions and other factors to determine if a traffic signal is needed.

While the introduction of traffic signals could create a new risk for rear-end or side-impact collisions (red-light running), the risk of such incidents is expected to be far lower than for the current configuration. Further, the proposed traffic signals at the intersections of NE 29th Avenue, NE 50th Avenue, and NE 72nd Avenue meet established national warrants for implementation as defined in the Federal Highway Administration's *Manual of Uniform Traffic Control Devices* (2003). The intersection at NE 92nd Avenue does not currently meet signal warrants for 2015, but is expected to do so by the year 2033. Washington State Department of Transportation will conduct another traffic signal warrant analysis for this intersection during the final design process.

The Build Alternative would also increase the number of travel lanes to two in each direction, providing a safer means of passing slower moving traffic. Reduced congestion on the corridor would attract some trips that might otherwise divert to alternate routes. These alternate routes are generally designed to a less stringent standard, so some reduction in

collision rates on other streets within the transportation study area may be realized as well.

Widened shoulders would be built along the entire project corridor, providing more travel space for bicyclists and pedestrians, and allowing stalled/broken down vehicles or maintenance utility vehicles to move completely out of the travel lane for safety. In the Dollars Corner area, improved sidewalks, crosswalks, pedestrian refuges, and signalized intersections would provide for safer pedestrian travel.

How would the project affect traffic on nearby roads?

The Build Alternative is expected to attract some traffic from nearby roads to the SR 502 corridor. This would reduce traffic volumes slightly on routes running parallel to SR 502, including NE 239th Street, NE 199th Street, and NE 179th Street, but not significantly enough to change the expected levels of service. In general, nearby parallel roads are expected to operate similarly whether the project is built or not. Modest increases in traffic on roads providing access to SR 502 could occur.

How would the project affect parking at Dollars Corner?

On-street parking is not allowed on SR 502 or connecting roadways, so the Build Alternative's effects to parking at Dollars Corner would be limited to off-street parking lots. Approximately 15–25 parking spaces from business lots would be lost or mitigated for at Dollars Corner due to right of way acquisition. This loss of parking spaces is not expected to have a long-term effect on businesses because it would be only a fraction of the existing spaces; however, Washington State Department of Transportation will attempt to mitigate for the parking spaces. Business owners would be compensated by Washington State Department of Transportation for the loss of parking spaces in accordance with the Uniform Relocation Assistance and Real Estate Acquisition Policies Act of 1970, as amended, as well as the Washington State Relocation Assistance – Real Property Acquisition Policy.

How would the project affect bicycle and pedestrian traffic?

Bicyclists who travel on SR 502 today find narrow shoulders that provide limited space, so bicyclists tend to ride closer to the travel lane. The Build Alternative would improve conditions for bicyclists by providing a widened shoulder, generally 10 feet wide, throughout the project corridor. Wider shoulders would provide bicyclists with adequate space to safely ride outside of the vehicle travel lane, which would reduce conflicts with vehicles on the roadway.

Sidewalks are currently provided along SR 502 only in short segments around the Dollars Corner area at the NE 72nd Avenue intersection. The Build Alternative would provide new sidewalks on all four legs of this intersection. These new sidewalks would be built to standards outlined by the Americans with Disabilities Act to better accommodate all pedestrians. Crosswalks would be provided at Dollars Corner as well as at the other signalized intersections at NE 29th Avenue, NE 50th Avenue, and NE 92nd Avenue, which would improve the safety for pedestrians crossing SR 502. Sidewalks would not be provided at locations outside of Dollars Corner, but pedestrians would be able to use widened shoulders on these segments. With the Build Alternative, shoulders would also be constructed for side road connections in the project corridor, which would accommodate bicycles and pedestrians as they approach SR 502 along these routes.

The *Clark County Trails and Bikeway System Plan* (adopted 2006) has identified a future regional trail along the SR 502 corridor for bicycle and pedestrian access from I-5 to Battle Ground, which would connect the I-5 Corridor Trail and the Battle Ground/Fisher's Landing Trail. This trail is not proposed as part of the SR 502 Corridor Widening Project, though the Build Alternative does not preclude future development of the trail.

How would the project affect transit?

With the Build Alternative, the travel conditions described earlier in this chapter for moving people and goods would also improve existing and future transit service using the project corridor; buses would experience improved travel times and reduced congestion, which would improve service reliability.

C-TRAN operates bus transit services within Clark County. Currently, Route 47 is the only C-TRAN route operating on the SR 502 project corridor. This route operates between the Battle Ground Transit Center and the Vancouver 7th Street Transit Center, traveling on SR 502 between Battle Ground and I-5. Route 47 operates only one trip into Vancouver during the morning commute, with one return trip to Battle Ground during the evening. While no additional service is currently planned along the corridor, the addition of a park-and-ride lot along SR 502 has been considered. The location for this potential park-and-ride lot has yet to be determined. The *Clark County Metropolitan Transportation Plan* proposes a new park-and-ride lot near the I-5/SR 502 interchange, with construction sometime during the 2020–2030 timeframe. The additional travel lanes on SR 502 with the Build Alternative would support more efficient travel to a future park-and-ride in this vicinity. Coordination with C-TRAN and Clark County will continue throughout the construction of the SR 502 project.